REMARKS

Claims 2-4, 7-9, 11-13, 16-18, 21-23, 25-29, 31-32, 38-40, 43-45, and 48-50 remain in the application. Claims 2-4, 7, 9, 11, 13, 16, 17, 21, 22, 25, 27, 28, 38, 43, and 48 have been amended hereby.

The claims have been carefully reviewed and amended with particular attention to the points raised in the Office Action. It is submitted that no new matter has been added and no new issues have been raised by the present response.

Reconsideration is respectfully requested of the rejection of claims 16-18, 21-23, 27-29, 38-40, 43-45, and 48-50 under 35 U.S.C. § 102(a), as allegedly being anticipated by PCT International Patent Application No. WO 98/02982 (Malkamaki et al.).

Applicant has carefully considered the comments of the Office Action and the cited reference, and respectfully submits that claims 16-18, 21-23, 27-29, 38-40, 43-45, and 48-50 are patentably distinct over the cited reference for at least the following reasons.

The present invention relates to a communication device and method for performing bidirectional communication between a communication terminal device and a base station device. One frame is prescribed for each predetermined time period and a plurality of time slots are formed in one frame. In each slot of an uplink period, communication of a down-link from the base station device to the communication terminal device is performed by using a multicarrier signal having data dispersed to m units of subcarriers for transmission, where m

is an integer not smaller than two. Communication of an up-link from the communication terminal device to the base station is performed by using a multicarrier signal having data dispersed to j units of subcarriers for transmission, where j is an integer smaller than m, or a multi-carrier signal having data dispersed to m units of subcarriers for transmission. Communication is also possible using a low-speed method involving only a single carrier signal. Because both high speed and low speed are possible it is necessary to provide discrimination between the two kinds of signals. Error detection is also performed.

Malkamaki et al., as understood by Applicant, relates to a mobile communications system wherein mobile communications apparatuses transmit encoded speech in accordance with a first protocol and transmit extended data in accordance with a second protocol. A wideband extension is divided into time slots that are substantially in phase with time slots for speech transmission, and signaling channels provided for speech are also used for establishing data calls within the extension. The extended data are conveyed by a process of orthogonal frequency division multiplexing, the multiplex being created by an inverse fast Fourier transform and the transmission frequencies undergoing a hopping sequence.

The Office Action states that Malkamaki et al. discloses, inter alia, a base station device comprising discrimination means for discriminating the multi-carrier signal using m subcarriers and the single carrier (see Office Action, p. 2, ln. 20 to p. 3, ln. 4). Applicant respectfully disagrees.

The Office Action cites p. 8, lns. 19-22, p. 10, lns. 2-13, and Fig. 6 of Malkamaki et al. as disclosing a discrimination means for discriminating the multi-carrier signal using m subcarriers and the single carrier (see id.).

As understood by Applicant, p. 8, lns. 19-22 of Malkamaki et al. relates to a division of a wideband extension into a plurality of wideband carriers, with the number of carriers contained within a particular extension and the bandwidth allocated to each extension depending upon required data rates (see Malkamaki et al., p. 8, lns. 19-22).

As understood by Applicant, p. 10, lns. 2-13 of Malkamaki et al. relates to wideband transmission performed by dividing the wideband spectrum into a plurality of carrier signals, the carrier signals then being further sub-divided within the time domain to provide eight time slots compatible with conventional GSM (Global System for Mobile Communication)(see id., p. 10, lns. 2-13).

Data transmission takes place within each time slot by orthogonal division multiplexing (see id.), and the orthogonal division multiplexing allows data to be transmitted over a plurality of sub-carriers that are relatively close together compared to conventional frequency divisional multiplexing (see id.).

Fig. 6 of Malkamaki et al, as understood by Applicant, illustrates the top end of a GSM primary band downlink spectrum, and relates to the addition of wideband extension for data transmission, synchronized with speech transmission frames (see id., p. 5, lns. 4-6; p. 7, ln. 33 to p. 8, ln. 1).

In the presently claimed invention, when transmission of both a single-carrier signal and a multicarrier signal is possible at each slot, the state of the received signal is discriminated on the side of the base station device (see specification of the present application, p. 28, lns. 11-13).

The receiving processing system of the base station device of the present invention includes a low-noise amplifier connected to a transmission/receiving antenna through an antenna switch, an orthogonal detector connected to the low-noise amplifier through a receiving mixer, a parallel-serial converter and a fast Fourier transform (FFT) circuit connected to the orthogonal detector through an A/D converter, a parallel/serial converter connected to the FFT circuit, and a discrimination and selection circuit connected to the parallel/serial converters (see id.).

It is respectfully submitted that the cited sections of Malkamaki et al. do not disclose receiving means for receiving a multi-carrier signal or a single-carrier signal transmitted from the communication terminal device and discrimination means for discriminating the multi-carrier signal using m units of subcarriers and the single-carrier signal such that demodulation processing is performed on the basis of a discrimination result.

In the section entitled ''Response to Arguments'' the Office Action further cites p. 2, lns. 8-12, p. 4, lns. 7-9, p. 8, lns. 22-31, p. 10, lns. 9-14, p. 11, lns. 7-8, and Figs. 1, 4, and 6 of Malkamaki et al. as allegedly disclosing discriminating means for discriminating a single-carrier

signal and a multicarrier signal having plural subcarriers (see Office Action, p. 2, lns. 1-10).

As understood by Applicant, p. 2, lns. 8-12 of Malkamaki et al. relates to a first transmitting means that is arranged to transmit encoded speech data in accordance with GSM recommendations, and a second transmitting means that is arranged to transmit extended data within time slots that are in phase with first data time slots. Page 4, lns. 7-9 disclose that the second transmitting means transmits data by an orthogonal frequency division multiplexing process.

Page 8, lns. 22-31 of Malkamaki et al., as understood by Applicant, states that the wideband extension is divided into a plurality of carriers, with the number of carriers contained within a particular extension and the bandwidth allocated to each extension being dependent upon the data rates required.

As understood by Applicant, p. 10, lns. 9-14 of Malkamaki et al. relates to a description of data transmission over a plurality of sub-carriers using orthogonal frequency division multiplexing, and of the proximity of the sub-carriers compared to conventional frequency division multiplexing. Page 11, lns. 7-8 states that with a channel spacing of one megahertz a sub-carrier spacing of 3.5 kilohertz is provided for transmission of the orthogonal sub-carriers.

As understood by Applicant, each of the above-referenced sections of Malkamaki et al. relate to multi-carrier signals.

Regarding the drawings of Malkamaki et al. cited by the Office Action, Fig. 1 shows a cellular mobile environment, Fig. 4 shows the time division of carriers, and Fig. 6

illustrates the addition of wideband extension synchronized with the speech transmission frames shown in Fig. 4 (see Malkamaki et al., p. 4, ln. 29 to p. 5, ln. 6).

The Office Action further states that element 202 of Fig. 6 illustrates a single carrier signal, and that element 601 of Fig. 6 illustrates a multi-carrier signal (see Office Action, p. 2, lns. 5-7).

As understood by Applicant, however, element 202 of Malkamaki et al. relates to a conventional band representing a 25 megahertz region from 935 megahertz to 960 megahertz available for downlink transmissions from base stations to mobile stations (see Malkamaki et al., p. 6, lns. 9-11). Element 601 relates to a wideband extension that is divided into time slots TN0 to TN7 (see id., p. 8, lns. 13-14). The time slots of the wideband extension are synchronized to similar time slots of the conventional band (element 202)(see id.).

It is respectfully submitted that the sections and drawings of Malkamaki et al. cited in the section of the Office Action entitled ''Response to Arguments'' do not disclose or suggest discrimination means for discriminating the multi-carrier signal using m units of subcarriers and the single-carrier signal, as described above and as recited in amended independent claim 16.

Furthermore, it is respectfully submitted that the above-referenced sections of Malkamaki et al. do not disclose or suggest demodulation processing conforming to a received signal that is carried out by the receiving means based upon a

result of discrimination of the discrimination means, as recited in amended independent claim 16.

It is therefore respectfully submitted that Malkamaki et al. does not disclose or suggest a base station device for carrying out bidirectional data communication with a communication terminal device, the base station device comprising transmission means for carrying out communication of a down link to the communication terminal device by using a multi-carrier signal having data dispersed to a plurality of subcarriers for transmission, receiving means for receiving the multi-carrier signal or a single-carrier signal transmitted from the communication terminal device and demodulating data thereof; and discrimination means for discriminating the multi-carrier signal using m units of subcarriers and the single-carrier signal, so that demodulation processing conforming to a received signal is carried out by the receiving means based upon a result of the discrimination, as recited in amended independent claim 16.

Accordingly, for at least the above-stated reasons, it is respectfully submitted that amended independent claim 16, and the claims depending therefrom, are patentable over the cited references. Amended independent claims 21, 27, 38, 43, and 48, and the claims depending therefrom, are believed to be patentable over the cited reference for at least similar reasons.

Withdrawal of the rejection under 35 U.S.C. § 102(a) is respectfully requested.

Reconsideration is respectfully requested of the

rejection of claims 2-4, 7-9, and 11-13 under 35 U.S.C. § 103(a), as allegedly being unpatentable over Malkamaki et al. in view of U.S. Patent No. 6,400,679 (Suzuki).

Applicant has carefully considered the comments of the Office Action and the cited references, and respectfully submits that claims 2-4, 7-9, and 11-13 are patentably distinct over the cited references for at least the following reasons.

The Office Action notes that Malkamaki et al. does not disclose or suggest devices using fewer carriers than a first device during uplink communications (see Office Action, p. 3, lns. 21-22). Suzuki et al. is cited as allegedly showing the missing element.

Suzuki et al., as understood by Applicant, relates to a communication resource allocation method and apparatus for allocating signals of plural users in a predetermined band for transmission. A multi-carrier modulation section places a plurality of carriers continuously within a preliminary allocated band and modulates the individual carriers separately. An adder synthesizes a plurality of the carriers modulated by the multi-carrier modulation section, and an antenna transmits a synthesized output from the adder. Received signals are separated from each other completely to reduce interference from other mobile stations, and reduces the problem of application of other bandwidths when an application band width for use is defined.

For at least the reasons set forth above, it is submitted that Malkamaki et al. does not show or disclose receiving

means for receiving a multi-carrier signal or a single-carrier signal transmitted from the communication terminal device and discrimination means for discriminating the multi-carrier signal using m units of subcarriers and the single-carrier signal such that demodulation processing is performed on the basis of a discrimination result.

As understood by Applicant, Suzuki discloses a band division multiple access (BDMA) method to conduct communication resource allocation for multiple access by dividing a plurality of carriers for respective mobile stations (see Suzuki, col. 3, lns. 16-22). The carriers are continuously placed within a preliminary allocated band having a predetermined width (see id.). As illustrated in Fig. 2 of Suzuki, in the BDMA method a relatively wide band is initially allocated to a base station and then divided to respective mobile stations under the base station (see id., lns. 23-33; Fig. 2).

Regarding dependent claims 25-26 and 31-32, the Office Action further cites U.S. Patent No. 5,940,143 (Igarashi et al.) as allegedly disclosing a controllable passband filter for an OFDM system (see Office Action, p. 4, lns. 9-16).

Igarashi et al., as understood by Applicant, relates to an automatic gain controlling circuit and a high-definition television signal receiving apparatus that includes an input terminal for receiving a signal including first and second signal components, a first automatic gain controlling amplifier for amplifying the received signal and providing an amplified output signal, a filter for selectively passing a

signal portion in a predetermined band of the amplified output signal from the first automatic gain controlling amplifier, and a second automatic gain controlling amplifier for amplifying the signal portion passed by the filter and providing amplified output signal portion.

A switching signal generator responsive to one of the amplified output signal and the amplifier output signal portion for generating a switching signal is included, along with a switching circuit responsive to the switching signal for controlling the supply of a gain control signal to the first and second automatic gain controlling amplifiers in accordance therewith. An automatic gain control signal detector detects the amplified output signal for supplying an output indicative thereof to the switching circuit.

It is respectfully submitted, however, that neither Malkamaki et al., Suzuki, nor Igarashi et al., alone or in combination, disclose or suggest a communication system comprising a base station device having transmission means for carrying out communication of a down link to a communication terminal device by using a multi-carrier signal having data dispersed to a plurality of subcarriers for transmission, and receiving means for receiving the multi-carrier signal or a single-carrier signal transmitted from the communication terminal device and demodulating the data thereof, a first communication terminal device having transmission means for carrying out the communication of an up link to the base station device by using the multi-carrier signal for transmission, and receiving means for receiving the multi-

carrier signal transmitted from the base station device and demodulating received data, and a second communication terminal device having transmission means for carrying out the communication of the up link to the base station device by using the single-carrier signal, and receiving means for receiving the multi-carrier signal transmitted from the base station device and demodulating the received data, wherein the base station device further includes discrimination means for discriminating the multi-carrier signal using m units of subcarriers and the single-carrier signal, so that demodulation processing conforming to a received signal is carried out by the receiving means based upon a result of the discrimination, as recited in amended independent claim 2.

Accordingly, for at least the above-stated reasons, it is respectfully submitted that amended independent claim 2, and the claims depending therefrom, are patentable over the cited references. Amended independent claims 7 and 11, and the claims depending therefrom, are believed to be patentable over the cited references for at least similar reasons.

Withdrawal of the rejection under 35 U.S.C. § 103(a) is respectfully requested.

Should the Examiner disagree, it is respectfully requested that the Examiner specify where in the cited document there is a basis for such disagreement.

The references cited as of interest have been reviewed and are not seen to show or suggest the present invention, as recited in the present claims.

The Office is hereby authorized to charge any fees which

may be required in connection with this response and to credit any overpayment to Deposit Account No. 03-3125.

Favorable reconsideration is earnestly solicited.

Respectfully submitted,
COOPER & DUNHAM, LLP

Jay H. Maioli
Reg. No. 27,213

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